MV-22 OPEVAL
(OT-IIE)
Final Report Brief

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Outline

- Overview
- Summary of COI Resolution
- OPEVAL Waivers/Limitations
- Summary of Findings
- Quantitative Test Results
- Conclusions/Recommendations

Purpose

- To evaluate the operational effectiveness and suitability of the MV-22
- MV-22 is operationally effective
- MV-22 is operationally suitable in a land-based environment
- MV-22 suitability in shipboard environment undetermined pending embarked OT of the BFWS (shipboard compatibility KPP)

Overview

- Test organized to put the aircraft through its paces as the fleet would.
- Is aircraft operationally effective and suitable in its current configuration?
- Can the MV-22 effectively perform all described mission areas and is it maintainable?
- Test of the aircraft and its supporting infrastructure.

Overview

- 02 Nov 99 - 21 Jul 00
- 4 - LRIP I Aircraft
- 522 Sorties 804.5 Flight Hours
- 15 Pilots
- ~ 90 Maintenance Personnel
- 44 Trooplift Sorties, 708 Troops

Overview

- Ashore
  - NAWC Pax River, MD — 2 - 5 Nov 99
  - MCAS New River, NC — 6 Nov - 6 Dec 99
  - Hurlbert Field, FL — 15 - 19 Nov 99
  - MCAS Yuma,AZ — 1 Mar - 31 May 00
  - Kirtland AFB, NM — 2 - 19 Mar 00
  - NAWC China Lake, CA — 1 - 21 Jun 00
  - MCAS New River, NC — 22 Jun - 21 Jul 00

Overview

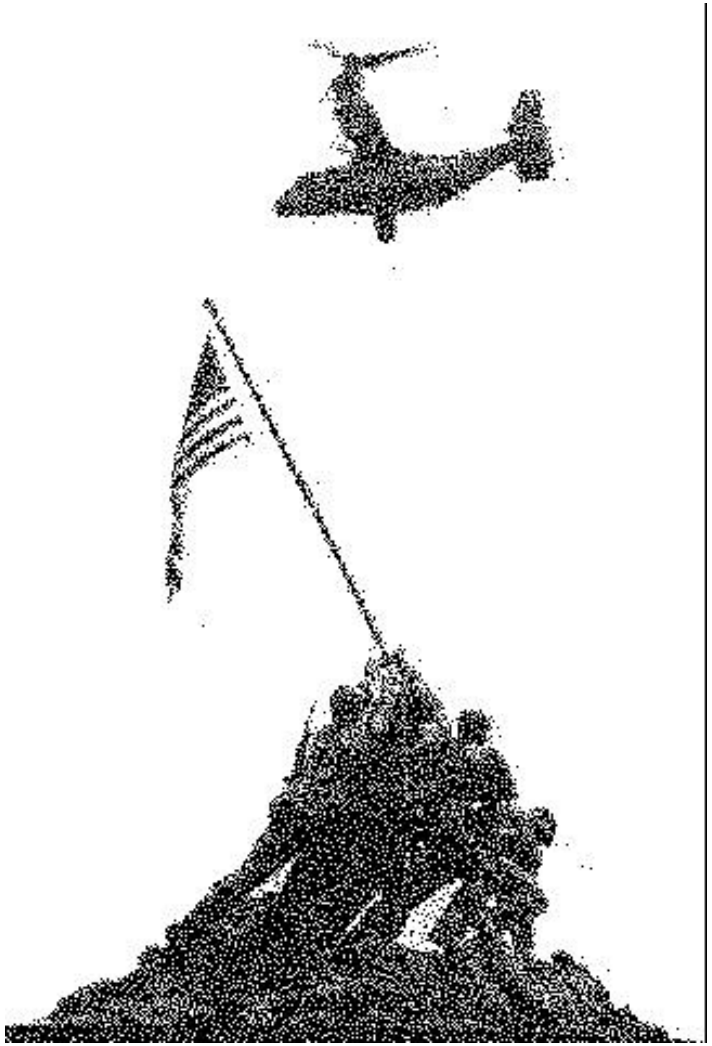
- At Sea
  - USS SAIPAN 28 Sorties, 32 Flt hrs

  - USS ESSEX 58 Sorties, 65 Flt hrs
  - USS TORTUGA 15 Sorties, 25 Flt hrs

Overview

- 8 April 2000 Class A flight mishap attributed to Vortex Ring State (VRS) phenomenon.

- VRS existence does not lessen V-22 operational effectiveness.



Effectiveness COI Resolution

• Assault Support	• Satisfactory
• Self Deployment	• Satisfactory
• MV Survivability	• Partially Resolved
• Tactics	• Satisfactory

Suitability COI Resolution

- Reliability
- Maintainability
- Availability
- Logistic Supportability
- Compatibility
  - Land based
  - Ship board
- Interoperability

- Satisfactory
- Satisfactory
- Unsatisfactory
- Partially resolved
  - Satisfactory
  - Unresolved
- Partially resolved

Suitability COI Resolution

• Training	• Satisfactory
• Human Factors	• Satisfactory
• Safety	• Satisfactory
• Documentation	• Unsatisfactory
• Diagnostics	• Satisfactory
• Software	• Satisfactory

Summary of Findings

- 11 Enhancing Characteristics
  - Revolutionizes Assault Support Operations
- 20 Major Deficiencies
  - Adversely affects mission accomplishment - not a reasonable workaround
- 72 Minor Deficiencies

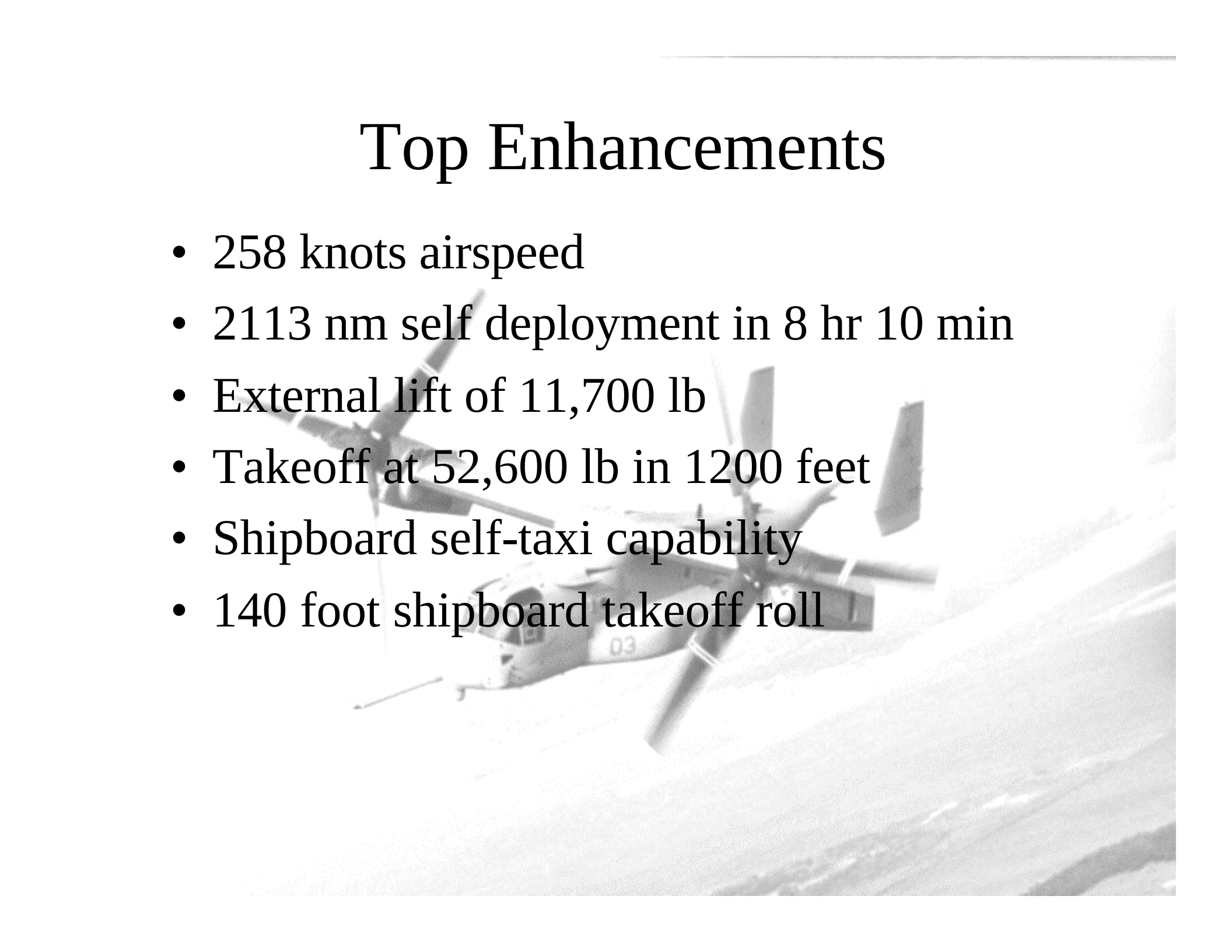
Summary of Findings

- Limitations -1 Severe 6 Major
  - Requires additional OT to resolve COIs

- 20 relevant CNO Waiver items
  - 6 resulted in major limitations to test

Top Enhancements

- 258 knots airspeed
- 2113 nm self deployment in 8 hr 10 min
- External lift of 11,700 lb
- Takeoff at 52,600 lb in 1200 feet
- Shipboard self-taxi capability
- 140 foot shipboard takeoff roll



Top Enhancements

- 15 min short notice/scramble launch
- Aerial refueling simple for inexperienced pilots
- Decreased threat exposure time
- Greater range coverage for the MEU
- Enhanced pilot situational awareness

Major Effectiveness Deficiencies

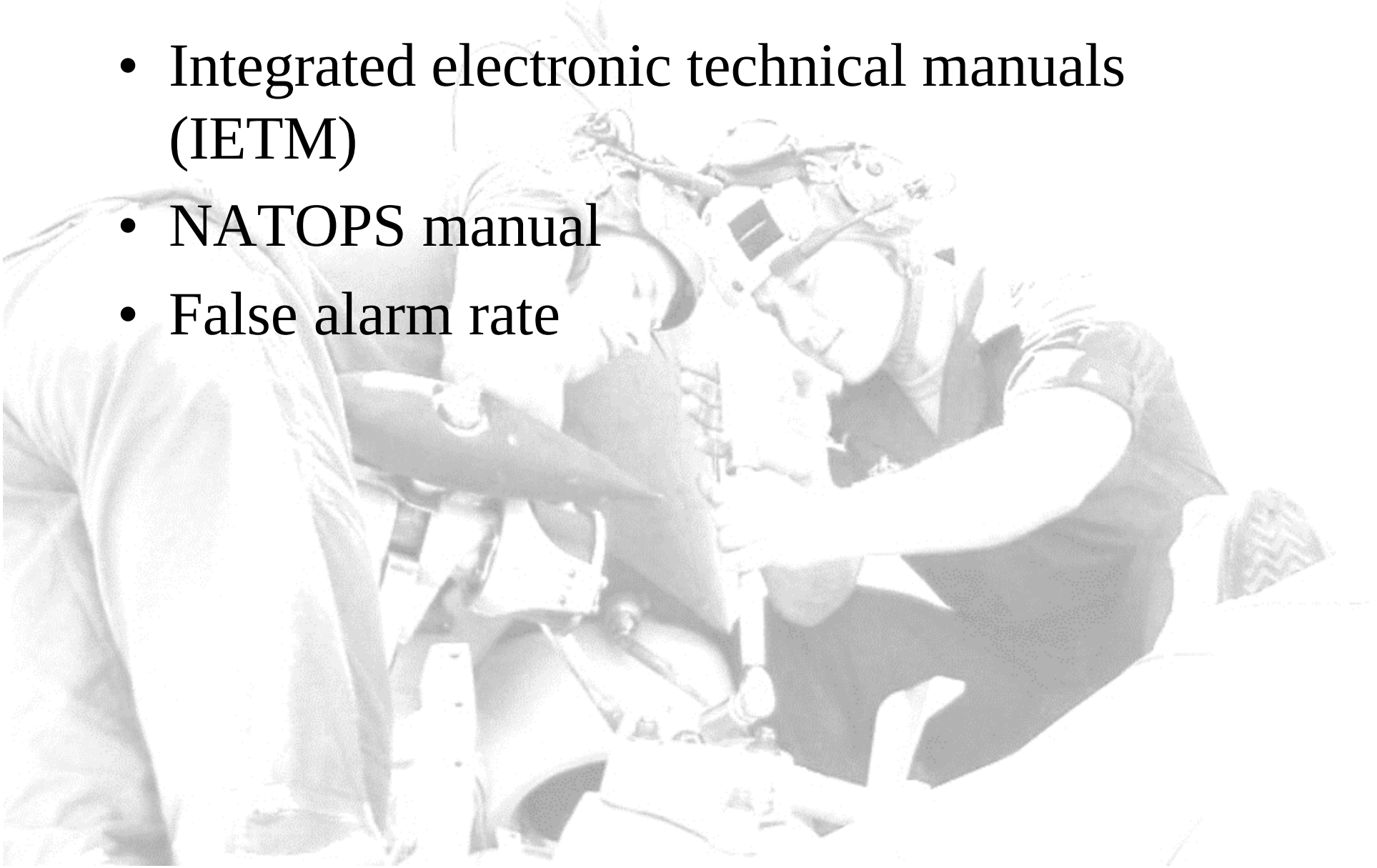
- Lack of a hoist
- No fastrope from cabin door

Major Suitability Deficiencies

- Mean time between failure
- Swashplate actuator failure rate
- Fastener failure rate
- Mean flight hour between unsched. maint.
- Mean repair time for abort
- MC/FMC rate
- BFWS system reliability
- Windscreen failure rate

Major Suitability Deficiencies

- Integrated electronic technical manuals (IETM)
- NATOPS manual
- False alarm rate



Suitability Data Collection Limitations

- **7 significant production deficiencies.**
  - **BFWS**
  - **Rotorhead clickstuds**
    - **Z-bracket**
    - **Lightning plate**
  - **Swashplate grease seals**
  - **Spindle bearing expansion bolts**
  - **Swashplate actuator links**
  - **Sliprings**
- **RM&A data collected prior to 22 Feb 2000 were unrepresentative of expectations for an aircraft entering OPEVAL. RM&A COIs were resolved using data collected after 22 Feb 2000.**

Significant Waivers to OPEVAL

- "DT&E Results. V-22 mean time between failure and false alarm rate have not achieved technical thresholds of TEMP M960.”
- "Inadequate cockpit/cabin nuclear biological and chemical overpressure protection.”
- "AN/APR-39A(V)2 degraded Band 2 angle of arrival.”

Significant Waivers to OPEVAL

- "Unable to align light weight inertial navigation system without Global Positioning System signal."
- "Aircraft not cleared for air combat maneuvering."
- "Crashworthy auxiliary fuel tanks not available for test."
- "Defensive weapon system not available for test."

Top Limitations

- Non-fleet representative BFWS System.
- Supply system
- Intermediate and depot level maintenance
- No clearance for LHA/LHD spots 5 and 6
- No clearance for night shipboard short takeoffs
- No digital data burst capability
- No production representative mission planning system.

Operational Effectiveness Results

Parameter	Threshold	Result
Payload		
Troops	24	24
External	10,000 lb	11,700 lb
Cruise Speed	240 Kt	258 Kt
Mission Radius		
Amphib Pre-asslt Raid	200 nm x 2	205 nm x 2
Land Trooplift	200 nm x 1	243 nm x 1
Land External	50 nm x 1	>50 nm x 1
Sea Trooplift	50 nm x 2	80 nm x 2
Sea External	50 nm x 1	51 nm x 1

Operational Effectiveness Results

Parameter	Threshold	Result
Self Deployment	2100 nm	2113 nm
V/STOL Capability		
Vertical Takeoff & Land	Yes	Yes
Shipboard STO	300 ft	140 ft
Ground STO	3000 ft	1200 ft
Aerial Refueling	Yes	Yes
Survivability	12.7 @ 90% V	12.7 & 14.5

Operational Suitability Results

COI	Threshold	Result
Reliability		
MTBF	≥ 1.4 hrs	0.7 hrs
MR	≥ 85%	92%
MFHBA	≥ 17 hrs	17 hrs
MTBOMF	None	15 hrs
Maintainability		
MTAT	≤ 15 min	8 min
MRTA	≤ 4.8 hrs	5.9 hrs
MMH/FH	≤ 11 hrs (Obj)	19 hrs
MCMT	≤ 3.7 hrs	2.5 hrs
MFHBUM	≥ 0.7 hrs	0.3 hrs

Operational Suitability Results

COI	Threshold	Result
Availability		
MC	≥ 82%	57%
FMC	≥ 75%	11%
Compatibility		
Land Based	Yes	Yes
Shipboard	Yes	Undetermined
Diagnostics		
FD	≥ 70%	92%
FI	≥ 70%	87%
FA	≤ 25%	92%

OPEVAL Conclusions

- MV-22 is operationally effective.
- MV-22 is operationally suitable in a land-based environment.
- Shipboard MV-22 suitability is undetermined pending embarked OT of the BFWS. (shipboard compatibility KPP)

OPEVAL Recommendations

- Do not release MV-22 to the fleet until shipboard compatibility is satisfactorily demonstrated through reliable operation of BFWS during embarked operational testing.

- Continue developmental testing to investigate HROD/VRS phenomena and determine safe flight margins.

BFWS VCD OT-IIE1

Verification of Correction of Deficiency
Blade Fold Wing Stow

- **Land Based**
  - **2.6 flight hours**
  - **4 flights**
  - **43 independent BFWS Operations**
  - **16 “Complete” fold cycles**
- **Sea Based**
  - **2.8 flight hours**
  - **4 flights**
  - **37 independent BFWS Operations**
  - **16 “complete” fold cycles**

“Conclusion. The MV-22 is operationally effective and operationally suitable.”

Questions?